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Technical Memorandum No. 2

1980 SPACE REQUIREMENTS

Planning Department
City of Fayetteville
August, 1963

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I. INTRODUCTION

Purpose

The purpose of this memorandum is to provide a basis for scaling the land area needed to accommodate expected growth in the community in the period up to 1980. The focus here is on how much land will be needed for the various uses of land. The process involved is simply that of developing reasonable estimates of the demands that new growth will make upon the community in terms of the space required to accommodate this new growth.

The estimates presented will be used in the formulation of a land use plan and community facilities plan. They are intended to provide reasonable yardsticks in scaling the land use plan, and in estimating the future demand on community facilities.

Scope

Each of the broad categories of land use was examined separately in terms of its existing extent within the community, and assumptions were made regarding its growth in the future. The derivation of these estimates basically reflects the population growth expectations as presented in Technical Study No. 2, Population, published in January, 1963 by the Planning Department. The resultant estimates of the space needed for growth to 1980 are summarized at the end of this memorandum.

II. RESIDENTIAL SPACE NEEDS

1960 Housing Unit Distribution

The categories of housing unit types used by the Census Bureau in 1960 differed somewhat from those used in the 1960 land use survey. Census categories for which data on housing unit types are available on an urban-area-wide basis include the following:

Single-family attached and detached (trailers included)	16,381
Two-family units	927
Three-or-more-family units	1,947
Total units	<u>19,255</u>

Data on total housing units were available for the rest of the planning area. (In the following planning districts: 21, 22, and 38; land use totals were substituted for census totals since the planning area boundary divided census enumeration districts. Census totals were used for all other "rural" planning districts within the planning area.) An additional 3,553 units were therefore in the "rural" fringe. Adding this figure to the 19,255 units in the urban area resulted in a grand total of 22,808 housing units in the Fayetteville planning area in 1960.

The 1960 land use survey included all the land in the planning area and classified housing units into the following categories:

Single-family	17,307
Two-family	1,756
Multi-family (permanent)	1,747
Trailer courts	1,004
Total units	<u>21,814</u>

Thus there was a discrepancy of 994 units between the land use total and the census total. (The land use figure was 4.4 per cent less than the figure derived from the census.) Assuming the census total to be more reliable (due to the Census Bureau's refined techniques of organization and enumeration), the figure 22,808 is accepted for land use planning purposes as the total number of housing units in 1960.

In land use planning, however, the classification system used in the survey was more useful than that of the census; therefore, the total 22,808 housing unit supply of the planning area was apportioned among the land use categories as follows:

	Units	Per cent
Single-family	17,334	<u>76</u>
Two-family	2,053	9
Multi-family	2,281	10
Trailer courts	1,140	5
Total units	<u>22,808</u>	<u>100</u>

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Trends in Housing Unit Distribution

An historical trend in the distribution of housing units was established by using the urban area of 1950 (City of Fayetteville and South Fayetteville or Massey Hill) and establishing a trend line. This is not an entirely valid procedure since the 1950 urban area and the 1960 planning area are two different geographical entities; but it does yield significant general trends. The housing unit distribution for Cumberland County was also determined for 1950 and 1960 since this trend would not be distorted by boundary changes. Following are the resulting data:

	Planning Area 1950*		1960		Cumberland County 1950		1960	
Single-family	7,007	66.6%	17,334	76%	16,190	74.1%	27,950	76.5%
Two-family	1,555	14.8	2,053	9)	5,175	23.7	3,855	17.3
Multi-family	1,887	17.9	2,281	10)				
Trailer courts	71	.7	1,140	5	485	2.2	4,726	6.2
Total	10,520	100.0	22,808	100	21,850	100.0	36,531	100.0

*Estimated distribution for 1950 urban area (City of Fayetteville and South Fayetteville)

1960 Population in Housing Units

Not all residents of the planning area live in housing units. Some live in college dormitories, rest homes, nurses dormitories, hospitals, etc. In 1960, there were 721 persons in the urban area who lived in such group quarters, representing 1.1 per cent of the total 66,073 persons in the urban area. Some 65,352 persons lived in housing units, averaging 3.66 persons per occupied housing unit. (Some 1,380 units were vacant indicating a vacancy rate of 7.2 per cent.)

1980 Population in the Planning Area

Estimates were made of the 1980 population of the planning area in the Planning Department's Technical Study No. 2, Population, published in January, 1963. These estimates ranged from 152,000 to 168,000; the median estimate is 160,000.

1980 Population in Housing Units

It was assumed that the percentage of residents living in group quarters in the planning area in 1980 would be roughly the same as in 1960 for the urban

Trends in Housing Unit Distribution

An historical trend in the distribution of housing units was established by using the census data of 1950 (City of Knoxville and South Fayetteville or (Knoxville 1950) and establishing a trend line. This is not an entirely valid estimate since the 1950 census and the 1950 housing data are two different geographical entities but it does yield significant general trends. The housing unit distribution for Cleveland County was also determined for 1950 and 1960 since this trend would not be changed by boundary changes. Following are the resulting data:

Housing Unit	Planning Area		Cleveland County	
	1950*	1960	1950	1960
Single-family	17,007	19,334	14,100	14,100
Two-family	7,552	9,000	3,150	3,150
Multi-family	1,387	2,381	400	400
Trailer court	21	1,100	200	200
Total	17,967	22,815	14,850	17,850

*Estimated distribution for 1950 (Knoxville City of Knoxville and South Fayetteville)

1950 Population in Housing Units

List all residents of the planning area live in housing units. Some live in college dormitories, not homes, under dormitory, hospital, etc. In 1950, there were 257 persons in the urban area who lived in such group quarters, representing 1.1 percent of the total 22,815 persons in the urban area. Some 22,558 persons lived in housing units, averaging 3.66 persons per occupied housing unit. (One 1,000 units were vacant reflecting a vacancy rate of 4.3 per cent.)

1950 Population in the Planning Area

Estimates were made of the 1950 population of the planning area in the Planning Commission's Technical Study for 5. Population estimates for 1950. These estimates ranged from 145,000 to 160,000; the median estimate is 150,000.

1950 Population in Housing Units

It was assumed that the percentage of residents living in group quarters in the planning area in 1950 would be roughly the same as in 1950 for the urban

area (1.1 per cent). On this assumption, the following distribution of persons between group quarters and housing units was made:

	Low	Med	High
Housing Units	150,200	158,200	166,200
Group Quarters	1,800	1,800	1,800
Total	152,000	160,000	168,000

1980 Total Number of Housing Units

It was further assumed that the average number of persons per occupied housing unit in the 1980 planning area would be 3.6 (slightly lower than the 1960 figure of 3.66 for the urban area); and that the vacancy rate in 1980 would be 5 per cent (it was 7.2 per cent in the 1960 urban area). The assumed breakdown between occupied and vacant units would then be as follows:

	Low	Med.	High
Occupied Units	41,800	43,900	46,200
Vacant Units	2,200	2,300	2,400
Total	44,000	46,200	48,600

1980 Housing Unit Distribution by Type

The general trends in housing unit distribution presented previously were projected to 1980. Following are the estimated number and per cent of housing units by type for 1980:

	1960			1980		
				Low	Med.	High
Single-family	17,334	76%	75%	33,000	34,600	36,400
Two-family	2,053	9	8	3,500	3,700	3,900
Multi-family	2,281	10	9	4,000	4,200	4,400
Trailer courts	1,140	5	8	3,500	3,700	3,900
Total	22,808	100	100	44,000	46,200	48,600

Conversions and Housing Unit Losses by 1980

There were 1,592 dilapidated housing units in the urban area in 1960. This figure (rounded to 1,600) was used as an admittedly somewhat arbitrary estimate of the number of conversions and dwelling unit losses by 1980. A further assumption was made that the distribution of these losses among the housing unit types would roughly parallel the projected 1980 distribution by type of unit.

Following, then, are the estimates of housing unit conversions and losses and the number of 1960 housing units that might be remaining in 1980:

	1960	Losses	Remain in 1980 (rounded)
Single-family	17,334	1,200	16,100
Two-family	2,053	100	2,000
Multi-family	2,281	200	2,100
Trailer courts	1,140	100	1,000
Total	22,808	1,600	21,200

New Housing Units Needed 1960-1980

The number of new housing units needed by 1980 would be the total units in 1980, estimated previously, less the 1960 units which might remain through 1980. Following are the estimates of new housing units needed, 1960-1980:

	Low	Med.	High
Single-family	16,900	18,500	20,300
Two-family	1,500	1,700	1,900
Multi-family	1,900	2,100	2,300
Trailer courts	2,500	2,700	2,900
Total	22,800	25,000	27,400

1960 and 1980 Density of Development

The 1960 densities of development in housing units per net acre (based on the land-use survey) for the city, fringe, and planning area, are listed below:

	City	Fringe	Planning Area
Single-family	4.3	3.6	4.0
Two-family	10.6	10.9	10.7
Multi-family	11.4	9.9	11.2
Trailer courts	10.8	9.2	9.3
Total	5.0	4.2	4.6

It was assumed that the trend toward more land per unit, as reflected in the fringe density, would continue for single-family, two-family, and trailer court units. It is quite probable, however, that permanent multi-family density may increase rather than decrease, especially if apartment units begin to develop with three or more stories. Following are the assumed densities for the new housing units built during the 1960-1980 period:

Following table shows the number of persons who were under 16 years and the number of persons who were 16 years and over in 1900.

Persons in 1900		Persons in 1900	
Under 16	1,000	Under 16	1,000
16 and over	1,000	16 and over	1,000
Total	2,000	Total	2,000

Persons in 1900 and 1901

The number of persons in 1900 and 1901 was 1,000 in each year. The number of persons in 1900 and 1901 was 1,000 in each year. The number of persons in 1900 and 1901 was 1,000 in each year.

Persons in 1900		Persons in 1900	
Under 16	1,000	Under 16	1,000
16 and over	1,000	16 and over	1,000
Total	2,000	Total	2,000

Persons in 1900 and 1901

The number of persons in 1900 and 1901 was 1,000 in each year. The number of persons in 1900 and 1901 was 1,000 in each year. The number of persons in 1900 and 1901 was 1,000 in each year.

Persons in 1900		Persons in 1900	
Under 16	1,000	Under 16	1,000
16 and over	1,000	16 and over	1,000
Total	2,000	Total	2,000

The number of persons in 1900 and 1901 was 1,000 in each year. The number of persons in 1900 and 1901 was 1,000 in each year. The number of persons in 1900 and 1901 was 1,000 in each year.

Single-family	3.6
Two-family	10.0
Multi-family	11.0
Trailer courts	8.0

Added Space Requirements for Residential Land

The number of additional acres of land required for development for each type of housing unit was determined by applying the assumed density of development to the number of additional units that were assumed would be built between 1960 and 1980. Following are the number of additional acres needed:

	Low	Med.	High
Single-family	4,690	5,140	5,640
Two-family	150	170	190
Multi-family	170	190	210
Trailer courts	310	340	360
Total	5,320	5,840	6,400

Space Losses from 1960 Residential Acreage

Before the total space requirements for residential land use could finally be obtained, estimates had to be made of the losses in housing unit acreage from the 1960 stock. This generally occurs three ways: (1) land is converted from residential use to other types of uses; (2) land in low density residential use is converted into higher density use (as in the case of dividing a large single-family house into apartments); (3) various types of urban renewal and highway construction.

Following are estimates of land taken out of residential use or replaced with new residential use:

	Housing Unit Losses	Density	Acreage Losses
Single-family	1,200	6	200
Two-family	100	11	10
Multi-family	200	13	20
Trailer courts	100	10	10
Total	1,600		240

Total Space Requirements for Residential Land--1980

The total estimated amount of land required for residential land use in 1980 was derived by (1) taking the number of acres in residential use in 1960; (2) subtracting the acreage losses between 1960 and 1980; and (3) adding the new acreage required by 1980:

	Acres in 1960	Acreage in 1980		
		Low	Med.	High
Single-family	4,302	8,790	9,240	9,740
Two-family	164	300	320	340
Multi-family	156	310	330	350
Trailer courts	108	410	440	460
Total	4,730	9,810	10,330	10,890

III. COMMERCIAL SPACE NEEDS

Estimates of Total Commercial Land

Estimate based on per cent acreage increase-- Between 1950 and 1960, commercial land in the planning area increased by 127 per cent (from 192.9 acres to 438.8 acres). During this period, population within Fayetteville's primary trade area (Cumberland County) increased by 55 per cent. Thus, the amount of land used commercially increased slightly more than twice as fast as its primary trade area population. There are at least two main reasons for this: (1) The recently-developed shopping centers are devoting more and more land to parking (as much as three or four times as much area as their retail floor space); and (2) commercial establishments catering to the automobile (drive-in movies, auto sales lots, drive-in restaurants, etc.) also have large spaces devoted to storage of vehicles.

Estimates made of Cumberland County's 1980 population increase indicate a somewhat slower rate of growth during the 60's and 70's (36-39 per cent per decade) than that of the recent decade. If commercial land continues to increase 2.3 times as fast as the population, its growth rate would be 83-90 per cent per decade.

	1950	1960	1970		1980	
			High	Low	High	Low
Commercial land	192.9	438.8	833.7	803.0	1584.0	1491.9

Estimate based on per cent population increase--The immediate planning area's 1980 population estimates indicate a growth rate of 40-47 per cent per decade (compared to 59 per cent during the 50's). If commercial land increases in proportion to this expected growth, following would be the 1970 and 1980 amount of commercial land:

<u>1950</u>	<u>1960</u>	<u>1970</u>		<u>1980</u>	
		<u>High</u>	<u>Low</u>	<u>High</u>	<u>Low</u>
192.9	438.8	645.0	614.3	948.1	860.0

Estimate based on acres per 100 persons--In 1950 the ratio of commercial land to planning area population was .39 acres per 100 persons. By 1960, this ratio had increased to .56. If this ratio remains constant, the following would be the amount of commercial land in 1970 and 1980:

	<u>1950</u>	<u>1960</u>	<u>1970</u>		<u>1980</u>	
Ratio	.39	.56	.56		.56	
Acres	192.9	438.8	638.4	610.4	940.8	851.2

The above estimates are probably on the low side since the acres per 100 persons ratio is more likely to increase rather than remain constant. It increased from .39 in 1950 to .56 in 1960 (a 44 per cent increase). If the acres per 100 persons ratio continues to increase at this rate, it will be 8.1 in 1970 and 11.7 in 1980. These are extremely high ratios. For this next estimate it was assumed that the ratio would more reasonably increase to .7 in 1970 and .8 in 1980 - a somewhat more palatable possibility.

	<u>1950</u>	<u>1960</u>	<u>1970</u>		<u>1980</u>	
Ratio	.39	.56	.7		.8	
Acres	192.9	438.8	798.0	763.0	1344.0	1216.0

Estimate based on commercial employment--Commercial employment in the county (here meaning services, retail, finance, insurance, and real estate) increased from 10,621 in 1950 to 16,410 in 1960, for a growth of 55 per cent. If commercial land grows as fast in the future as commercial employment within the county, following would be the amount of commercial land in 1970 and 1980:

	<u>1950</u>	<u>1960</u>	<u>1970</u>	<u>1980</u>
Acres	192.9	438.8	680.1	1054.1

Estimate based on floor space growth--In the preparation of the central business district plan, much consideration was given to the growth possibilities of floor space within the CBD. Various projection techniques were used to estimate how much space within the CBD would be required for commercial functions in 1980. Some of the techniques included an estimation of floor space for the planning area as a whole. A single estimate was then chosen as a basis for design of the CBD plan. On page 10 are some pertinent data derived in the formulation of the CBD floor space estimates.

Estimate based on total floor space growth rate--If the total amount of commercial land increases in proportion to the above estimated increase in floor space, following would be the 1980 estimates of total commercial land:

	1950	1960	1970	1980
Acres	192.9	438.8	596.3	811.8

This estimate would seem to be on the low side because of the trend toward more parking, more landscaping and loading space per square foot of floor space.

Estimate based on floor space - total area ratio--In 1962, there was a total of about 4,774,000 square feet of commercial floor space and 438.8 acres (19,114,000 square feet). Put another way, commercial floor space represented 25 per cent of total commercial land. Inside the CBD, this ratio was 88% (2,190,000/2,483,000); outside the CBD, it was 16% (2,584,000/16,631,000). In the future, some commercial land will develop in the CBD, at a high ratio; but much more will develop outside the CBD at a low ratio. Assuming that the additional commercial land added by 1980 will develop at a ratio of 18 per cent, by 1980 the commercial acreage will be 41,594,000 square feet (955 acres).

Summary and Choice of Design Estimate

Method	Acres of Commercial Land (rounded)			
	1950	1960	1970	1980
Per cent acreage increase	192.9	438.8	800	1490
Per cent population increase	192.9	438.8	610	860
Acres per 100 persons	192.9	438.8	610	850
	192.9	438.8	760	1220
Commercial employment	192.9	438.8	680	1050
Total floor space growth rate	192.9	438.8	600	810
Floor space - total area ratio	192.9	438.8	650	960

SQUARE FEET OF FLOOR SPACE

	1962			1980		
	CBD	Outside CBD	Total	CBD	Outside CBD	Total
II. Dependent Retail Trade	510,000	236,000	746,000	760,000	620,000	1,380,000
III. Administrative, Financial and Advisory Services	360,000	142,000	502,000	610,000	320,000	930,000
IV. Convenience Trade and Consumer Services	560,000	1,161,000	1,721,000	850,000	2,330,000	3,180,000
V. Independent Retail Trade and Repair Services	760,000	1,045,000	1,805,000	1,060,000	2,270,000	3,330,000
TOTAL	2,190,000	2,584,000	4,774,000	3,280,000	5,540,000	8,820,000
Per Cent Inc. 1962-1980				50%	114%	85%

For the purpose of formulating a land use plan, the 1980 estimate of 960 commercial acres was selected. It was within the lower portion of the range of estimates and derived from assumptions that seem most reliable.

Distribution of Commercial Acreage

Some of the estimated 960 acres of commercial land in 1980 will be within the central business district, some will be within neighborhood locations, some in highway commercial areas, and others in centrally located community serving areas. In formulating the land use plan, it was assumed that neighborhood shopping facilities would require .7 acres of land per 1,000 persons (a total of about 110 acres, using the low 1980 planning area estimate of 152,000 persons). The central business district would contain about 90 acres, assuming a constant ratio of floor space to total area. This leaves a total of 760 acres to be distributed in other centrally located positions and in highway commercial areas.

	<u>1980 Commercial Acreage</u>
Neighborhood-Serving	110
Central Business District	90
Other locations	760
Total	<u>960</u>

IV. INDUSTRIAL SPACE NEEDS

Estimates of Industrial Land

Manufacturing employment in Cumberland County increased from 3,935 in 1950 to 4,042 in 1960; a growth rate of less than 3 per cent. Obviously, past trends in manufacturing employment form a poor basis for estimating future manufacturing employment, especially in view of the community's objective of expanding its industrial base. The following estimate will be based on hypothetical assumptions about growth in manufacturing employment.

In Population, published in January, 1963, assumptions were made about the relationship between the armed forces labor force and the civilian labor force in the county. One hypothetical assumption was that the armed forces labor force might remain constant. If this were to be the case, civilian employment would have to grow from 30,932 in 1960 to 74,400-85,000 by 1980 (this implies a growth in civilian employment over twice as fast as that between 1950 and 1960) in order to reach a total county population of from 261,000-288,000. This means 43,500-54,000 new civilian jobs must be created with the county.

Throughout all urban areas in North Carolina, an average of 31.2 per cent of civilian workers are engaged in manufacturing activities. In Cumberland County, this figure is 13.0 per cent. In Mecklenburg County, for example, it was 22.8 per cent; Durham, 27.2 per cent; Guilford, 37.6 per cent, Forsyth, 40.8 per cent. In view of Fort Bragg and Pope Air Force Base, the trade and service section of Cumberland County's employment picture will continue to be strong; but it alone cannot support a population growth by 1980 in the magnitude of 261,000-288,000, as derived in the report, Population.

Of the 43,500 - 54,000 new civilian jobs that must be created to reach these estimates (assuming Fort Bragg strength doesn't increase significantly), let it be assumed that 25 per cent must come from new manufacturing jobs. This would mean about 10,900 - 13,500 new manufacturing jobs, or a total manufacturing employment of about 14,900 - 17,500.

Since nearly 70 per cent of the off-post population of Cumberland County reside within the planning area, it was further assumed that 70 per cent of the new manufacturing jobs will be located within the planning area (7,600 - 9,400 jobs).

The ratio of land area required per worker will vary probably from about 50 workers per gross acre in intensive activities, to about 6 workers per acre for extensive manufacturing activities. For these purposes, let it be assumed that the new manufacturing plants would develop at a density of 25 workers per acre. There would thus be a need of 300 - 380 additional manufacturing acres.

	1960	1970	1980
Acres in industrial use	660.0	800-830	960-1040

Estimates of Transportation, Communication, and Public Utility Land

An estimate of the space required for transportation, communication and public utility uses was derived using the same approach as used above for manufacturing. In 1960, 5.2 per cent of the County civilian employment were engaged in activities in this category; for urban North Carolina, 5.9 per cent were similarly engaged. Assuming that 5.5 per cent of the new jobs will fall in this category, there will be, by 1980, 2400 - 3000 new jobs in transportation, communication and public utilities. Again, assuming that 70 per cent of these new jobs will be created within the planning area, there will be 1700 - 2100 new jobs in this category in the planning area in 1980.

In 1960, there were about 4 employees per acre of land. However, much of the 1960 acreage was in rail marshalling yards and the City's sewage treatment plant. A more palatable assumption for 1980 would be about 30 employees per acre. This means 60 - 70 new acres in this category by 1980.

	1960	1970	1980
Acres in transportation, communication and public utility use	<u>286.5</u>	<u>320</u>	<u>350-360</u>

Estimates of Wholesale Land

The estimate of space needs for wholesale use was estimated, again using the projected employment approach. In 1960, 3.7 per cent of urban North Carolina's total employment were in wholesale trade; for the City of Fayetteville, this figure was 3.8 per cent. Assuming that 3.8 per cent of the new jobs created in the county will be in wholesale trade, there will be about 1700 - 2100 new jobs in wholesale trade. Again assuming that 70 per cent of these will be created within the planning, there will be about 1200 - 1500 new wholesale employees in the planning area by 1980.

The space required per wholesale employee varies with the type of wholesaling activity; petroleum bulk station require in the neighborhood of one acre per three employees, while wholesaling activities proper might require as much as one acre per 30 employees. In 1960, there was one acre per 7.6 employees. Assuming eight employees per acre as the density of the added wholesale jobs, about 150 - 190 additional acres will be required for wholesale activities in 1980.

	1960	1970	1980
Acres in wholesale use	<u>88.9</u>	<u>150-160</u>	<u>240-280</u>

Estimates of Railroad Right-of-Way

There is no reason to believe that the number of acres in railroad rights-of-way will change significantly within the planning area by 1980, except perhaps in the Central Business District. For land use planning purposes, it was assumed that the acreage would remain constant to 1980 (310 acres).

V. PUBLIC AND INSTITUTIONAL

Public Uses

The largest public uses at present include the public watersheds, airport, city parks, schools, and other county or city-owned property. Land in public watersheds, airport, and city or county property (except for schools and recreation) are not expected to increase appreciably. The approach here will be to concentrate on land for schools and recreation.

Schools--An ideal number of students for an elementary school is in the range 450 - 540 (assuming 15 - 18 classrooms and 30 students per classroom). The Planning Department's projections of school membership¹ in the planning area show trends that indicate about 8,300 additional elementary school children for the planning area by 1980 (a 78 per cent increase over the 1960 figure). This indicates a need for the equivalent of 15 - 18 additional elementary schools with- in the planning area. Fifteen acres is a desirable site size for an elementary school in the Fayetteville area; this allows plenty of room for the structure, its setting and plenty of space for the diverse educational activities that take place in today's elementary school. This means the equivalent of 225 - 270 additional acres devoted to elementary schools.

Projections of the 1980 junior high membership in the planning area indicate about 4,500 additional students (a 11 per cent increase over 1960). This means the equivalent of about six additional junior high schools by 1980. Using thirty acres as the desirable site size for a junior high school, 180 additional acres would be required.

Senior high school membership projections indicate about 3,700 additional students would require the equivalent of about three new senior high schools in the planning area by 1980. Assuming a desirable site size of fifty acres per high school, about 150 additional acres would be required.

Altogether, these additional school students would require something in the neighborhood of 580 acres. (A small portion of the increase can no doubt be accommodated by expanding existing school plants; for land use planning purposes, however, it is assumed that additional school plants might be required as indicated above since a great many existing plants are already beyond desirable student populations. Too, these projections are based on a continuance of the dominant nine-month school year; a year-round, or so-called "trimester" plan, if instigated, would obviously change the overall picture.

Recreation

Park and Recreation facilities, by and large, fit into one of two broad categories: (1) neighborhood and community recreation centers serving local areas, and (2) area-wide facilities serving the entire metropolitan area with more specialized recreational opportunities. For recreational use within a community, many agencies (e.g. National Recreation Association, National Park

¹Pr. J. L. Pierce, Division of School Planning, Department of Instruction, Raleigh North Carolina in a talk before the 1963 school survey committee.

²"School Membership Projections, "Technical Memo. No. 6, Planning Department, October, 1963.

There is a significant positive correlation between the number of years of education and the number of years of experience. The correlation coefficient is 0.65, which is statistically significant at the 0.05 level. This suggests that individuals with more education tend to have more experience.

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1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific information required.

Service, Chicago Regional Planning Association, New Jersey State Planning Board and others) agree that one acre of land in public recreational use should be provided for about every 100 persons.

The Planning Department's projections indicate a probable 1980 planning area population of about 152,000 - 168,000 persons. One acre for every 100 persons would mean a total of 1,520 - 1,680 acres in public recreational use in 1980. Presently, the City of Fayetteville is the only public agency providing recreation outlets in the planning area; the City's total acreage in public recreation use in 1960 was 185 acres, indicating an aver-all need for 1,330 - 1,500 additional acres for public recreation in the planning area.

A detailed proposal indicating how these facilities might be distributed throughout the planning area in the future will be forthcoming in the Community Facilities Plan now being prepared by the Planning Department.

The total future space requirements for land in public use should probably fall in the following range:

	1960	1970	1980
Acres in Public Use	<u>2209.7</u>	<u>3080-3140</u>	<u>4310-4470</u>

Institutional Uses

Included under this heading are churches, private golf courses, Methodist College and other "quasi-public" uses. New churches can probably be expected to account for most of the additional acreage required by 1980 in this category.

The National Council of Churches has suggested one church for every 1,500 - 2,500 available population of Protestant preference.¹ (Hill's 1960 City Directory listed 127 Protestant, Catholic and Jewish churches in the Fayetteville area. With a 1960 population of 78,006, the planning area had about one church per 610 population.) A rough idea of the number of additional churches was derived by assuming one additional church per 2,000 additional population. According to population estimates made by the Planning Department, this means about 37 to 45 additional churches by 1980.

¹American Society of Planning Officials, "Churches and Planning Controls", Planning Advisory Service Information Report No. 106, January, 1958, p. 18.

The Urban Land Institute suggests that church sites be three to five acres in size.² Assuming four acres per additional church in the planning area, about 150 - 180 additional acres for churches will probably be required by 1980.

Since the 1960 land use survey, 77 acres were added to Green Vally Golf Course; this also has been included in the institutional acreage estimated in the future.

	1960	1970	1980
Acres in institutional use	<u>957.9</u>	<u>1100-1120</u>	<u>1180-1210</u>

The amount of land devoted to streets in 1960 within the planning area represented 21 per cent of the total amount of developed land. (This underestimates the true extent of street coverage in the planning area due to the large amounts of public and institutional land. Streets actually cover an area equal to 40 per cent of the combined categories: residential, commercial, and industrial. This is due to at least two reasons: (1) the many miles of secondary roads in the planning area serving rural land, and (2) the nature of the gridiron residential street pattern in some of the older sections of the city where streets covered large portions of the total area, serving housing on small residential lots.

In deriving an estimate of the future area needed for streets, it was assumed that (1) new subdivisions will develop with lower percentages of the total area devoted to streets and (2) that a portion of the additional homes would be built on existing streets. Roughly, a total area equal to one-fifth of the estimated additional acres needed for residential areas is assumed to be needed for streets in the planning area.

	1960	1970	1980
Acres in street rights-of-way	<u>2,616.0</u>	<u>3,100-3,200</u>	<u>3,680-3,900</u>

VI. SUMMARY OF SPACE NEEDS

The combined estimates of the space needs to accommodate the probable population in the planning area in 1980 amount to about 21,800 - 23,400 acres of land (a 77-90 per cent increase over 1960). This increase seems sound and reasonable to provide for the estimated planning area population of 152,000 - 168,000 in 1980 (a 95-115 per cent increase over 1960).

²Community Builders Handbook (Washington, D. C. Urban Land Institute), 1954, p. 89.

Whereas, in 1960, the total amount of developed land equalled about 28 per cent of the total land in the planning area; these estimates of the total developed land in 1980 point to a situation where about half (49-53 per cent of the total land is developed.

On an overall basis, the estimates indicate a slightly higher density of development (less acres per 100 persons) than in 1960. The overall acres per 100 persons ratio would drop from 15.8 in 1960 to around 13.9 to 14.3 in 1980. For residential land, however, the assumptions in this memorandum indicate a less dense development (more acres per 100 persons) than in 1960; residential acres per 100 persons would increase from 6.1 in 1960 to 6.4 in 1980.

These estimates will be used in helping to formulate a future land use plan. They should, however, be recognized for what they are: a set of estimates based on reasonable assumptions; they are not predictions.

The implications of this memorandum are clear: the community must accommodate an enormous amount of expansion in the coming years. The challenge to the community is to insure that this large amount of land will be soundly developed with adequate public facilities.

SUMMARY OF ESTIMATED SPACE NEEDS

	1960	1970		1980	
		Low	High	Low	High
RESIDENTIAL	(4,730.0)	(6,810)	(7,180)	(9,810)	(10,890)
Single-family	4,302.1	6,160	6,480	8,790	9,740
Two-family	163.9	220	240	300	340
Multi-family	156.0	220	240	310	350
Trailers	108.0	210	220	410	460
COMMERCIAL	(438.8)	(650)	(650)	(960)	(960)
INDUSTRIAL	(1,347.9)	(1,580)	(1,620)	(1,860)	(1,990)
Industrial	660.0	800	830	960	1,040
Transportation, Communication and Public Utilities	286.5	320	320	350	360
Wholesale	88.9	150	160	240	280
Railroad Right-of-Way	312.5	310	310	310	310
PUBLIC & INSTITUTIONAL	(3,167.6)	(4,180)	(4,260)	(5,490)	(5,680)
Public	2,209.7	3,080	3,140	4,310	4,470
Institutional	957.9	1,100	1,120	1,180	1,210
STREETS	(2,616.0)	(3,100)	(3,200)	(3,680)	(3,900)
TOTAL	(12,300.3)	(16,320)	(16,910)	(21,800)	(23,420)

